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July 2013 Volume 40 No. 7

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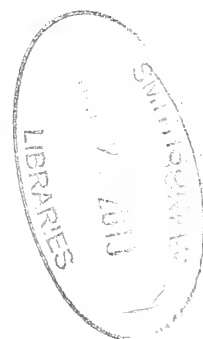
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The American Association of Zoo Keepers, Inc. exists to advance excellence in the animal keeping profession, foster effective communication beneficial to animal care, support deserving conservation projects, and promote the preservation of our natural resources and animal life.

ABOUT THE COVER

This month's cover comes to us from Meghan Murphy of Smithsonian National Zoological Park. The image is of their male lion Luke, and one of seven cubs at the National Zoo which were born to two sisters, Shera and Nababiep, in August and September of 2010. The three had come to the Zoo in 2006 from a private reserve in South Africa with a specific recommendation to breed from the Association of Zoos and Aquariums' Species Survival Plan (SSP) for African lions. Because the trio's genes were not represented elsewhere in North America, they were among the most genetically valuable lions in the country. Any offspring they produced would play an important role in a sustainable captive population.

Lions are the second-largest felid and the only cat with a tufted tail and mane. They stand three feet (one meter) tall at the shoulder and weigh 300 to 500 pounds (136 to 227 kilograms). In Africa, lions still live in most countries south of the Sahara Desert although East and southern Africa are home to the majority of the continent's lions. In West Africa, numbers have declined greatly and throughout the continent, they are becoming increasingly rare outside protected areas.

Lions are the only social big cat, with prides of females and young accompanied by one or more (usually two) adult males. In more arid areas where prey is less common and more dispersed, pride sizes are lower. A single male or coalition of males holds tenure over one or more prides, effectively excluding strange males from siring cubs with pride females. Source: <http://nationalzoo.si.edu/SCBI/AZA/FelidTAG/Species/Factsheets/lion.cfm>

Articles sent to **Animal Keepers' Forum** will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for **AKF**. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the Editor. The Editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed, appropriately-sized envelope. Telephone, fax or e-mail contributions of late-breaking news or last-minute insertions are accepted as space allows. Phone (330) 483-1104; FAX (330) 483-1444; e-mail is shane.good@aaazk.org. If you have questions about submission guidelines, please contact the Editor. Submission guidelines are also found at: aaazk.org/akf-submission-guidelines/.

Deadline for each regular issue is the 3rd of the preceding month. Dedicated issues may have separate deadline dates and will be noted by the Editor.

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ANIMAL KEEPERS' FORUM

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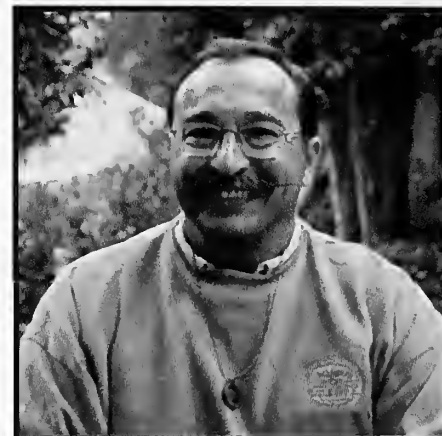
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Proudly Passionate

"Your passion will send you to the poorhouse" summarized J. Maureen Henderson in a *Forbes*, Inc. article last February. The author continued by contending that those who follow their passions end up in fierce competition with others vying for the same job. The end result, according to Henderson, is that few people achieve financial success in pursuit of their passions. The author continues, "Following your passion over your career pragmatism is a recipe for ending up in the poorhouse." Henderson further states:

"Very often, living is about finding solutions, workarounds, fixes and methods to get your needs met and these solutions, workarounds, fixes and methods often involve difficult, unpleasant work that doesn't allow for much creative self-expression. None of us are owed a life in which we get paid to do exactly what makes us happiest and the sooner you get over your resentment at the rarefied few who do make a living from their love, the better off you'll be."



Mistakenly, the author implies that the pursuit of passion and achieved success are mutually exclusive. I submit that those of us who proudly work in the profession of animal care have achieved success, though not on any great financial level. All the same, we have sought the solutions for our own career paths, often involving difficult, and unpleasant work, long hours, extra jobs, volunteering on weekends and anything else that would bring us closer to landing a job in the profession of our passion. The author is correct when she states that none of us are owed a life in which we get paid to do exactly what makes us happiest. Her mistake is assuming that only a few achieve that status and that hard work and dedication account for nothing.

A Passion Celebrated

Beginning every third Sunday in July, we celebrate National Zoo Keeper Week. It's a week of celebration but more importantly a week of awareness for the work that we do and the impact that we make on the lives of the animals in our care. It's a week when focus is placed on one of the most passion-based professions in the industry. For many of us, that passion came with a price; years of sacrifice and toil that made it possible for us to succeed in the quest of the profession of our passions. I am proud of what we do but moreover, I am in awe of the amount of dedication it took many of us to get here. I am reminded daily through my interactions with my fellow keepers.

A Matter of Pride

I have a morning ritual; one that originated 15 years ago when I had a dog. I spend my first moments on my back porch sipping my first cup of coffee. Originally, it was guard duty, a sentry watch ensuring that my yard was free of skunks or raccoons while my dog did his morning routine. While it's been several years since my dog has passed, I still enjoy that first moment of quietness. Too early for the additional sounds of traffic, the ambient sounds of my neighborhood are reduced to rustling leaves and the bark of some distant dog. I can't recall the first time I heard it but there is an additional sound that greets me almost daily. Ironically, it's not the sound of local fauna that I hear. Rather, the sound comes from work, a little over a mile away. It's Mbari, the male Transvaal lion who is one of many magnificent animals in my area. It's unmistakable when I hear his call, and it is as if he is reminding me where the rest of my day will be spent. Even in the solitude of my backyard, I remain connected to the profession for which I am greatly passionate.

I consider myself to be a member of the fraternal order of the fortunate. I am, by career, one who works in a vocation where we utilize both heart and mind to great benefit. I am proud of what I do and even more so, I am proud to be included in the circle of so many who worked so hard (and still do) to pursue the passion of their dreams.

As always, I welcome your thoughts and input. E-mail me at bob.cisneros@aaazk.org; I would love to hear from you. Happy National Zoo Keeper Week.

Bob Cisneros

References

Henderson, M.J. 2013. 3 Reasons Following Your Passion Will Send You to the Poorhouse. *Forbes.com*. Accessed 11 Feb 2013



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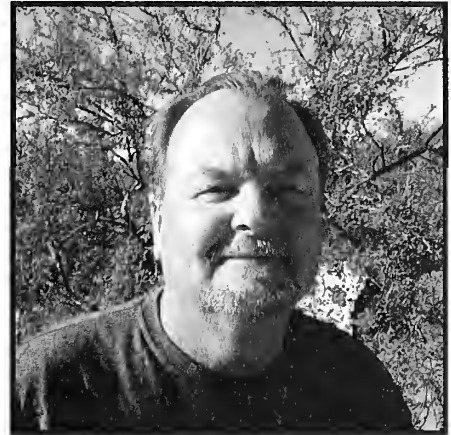
FROM THE CEO/CFO OF AAZK

To state the obvious, this is not the *Animal Keepers' Forum* you are used to receiving in the mail.

Please join me in congratulating Shane Good, Media Production Editor and Elizabeth Thibodeaux, Assistant Media Production Editor, of AAZK, for all their work in the evolutionary process of converting the AKF to a new look. Recently, these two individuals have given the *Forum* new life, and now they have given the *Forum* a new vessel. This has been a long and sometimes difficult road to navigate.

For most individuals, change is good. For other individuals, change can be difficult to accept.

The *Forum* has existed in 6" x 9" format for decades. Recently, readers have seen a change to color covers, two-color printing and color pictures in the article content. Evolution has now brought the *Forum* to standard magazine format with a four-color print process. The intent is to make the publication more attractive to both reader and advertiser, without changing the foundation of the magazine which is the dissemination of information for the animal care professional.



The look of the *Forum* is the first of many changes as the Board of Directors and Staff of AAZK begin to modernize your Association, making AAZK work more effectively for our membership at all levels.

Let's talk. Let me know how the *Forum* works for you and if you have any questions regarding the future of AAZK.

Ed.Hansen@AAZK.org

LOGO contest

We would like to remind our Zoo Keeper Artist Members about the Bowling for Rhinos Logo Contest! Please submit your artwork TODAY!

Our new BFR Logo will show more of what Bowling for Rhinos is and does and will be easier to use for all types of media and Chapter use. The announcement of the winner for the new logo will be at the 2013 AAZK Conference. The contest winner will receive a certificate of appreciation, recognition in all AAZK media and a specially-painted bowling pin trophy.

These are the parameters to follow:

- » All Five species of rhinos
- » "AAZK"
- » "Bowling for Rhinos"
- » An element to signify that BFR encompasses whole ecosystems and not just rhinos.
- » The designer may also include a bowling element, but not mandatory.
- » Four Color PROCESS (or "4 color" or "CMYK") and Black and White printing process options. No SPOT process colors.
- » Submitted as an .eps file with text converted to outlines.

August 20th deadline for artwork to be electronically submitted to AAZK at penny.jolly@aazk.org. Please e-mail Penny if you have any questions.



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Celebrate

The National Capital AAZK Chapter was founded in 2006 at Smithsonian's National Zoo and has grown exponentially. NCAAZK is currently the largest AAZK Chapter, reaching 100 members in 2012! Our members are a true mix of keeper and non-keeper staff, volunteers, and zoo supporters.

Smithsonian's National Zoological Park celebrates its 125th anniversary in 2014! The National Zoo and the Smithsonian Conservation Biology Institute (SCBI), headquartered in Front Royal, Virginia, teach and inspire people to protect wildlife, natural resources, and habitats. The National Zoo and SCBI oversee six science centers, world-class lab facilities, and teaching opportunities for future generations of scientists and conservationists.

Educate

Professional Development is one of NCAAZK's tenets, and we offer multiple opportunities for our members: **In DEPTH (Development, Education, Professionalism, Training, and Husbandry):** Monthly lunchtime seminars give keepers the ability to share research with the greater zoo community.

Short Seminars: NCAAZK facilitates hands-on body scoring classes, photo-taking safaris, and field trips to our Smithsonian Conservation Biology Institute and the Maryland Zoo.

Long Courses: Multiple-session courses, involving 12 to 16 hours of coursework, focus on a specific zoo keeper skill set. NCAAZK has offered two of these detailed courses — Behavioral Research Methods and Population Management.

Travel Grant: NCAAZK offers an annual \$500 scholarship to any member who completes work-related travel but does not receive full funding from the zoo.

Participate

NCAAZK promotes and participates in conservation programs worldwide and in our own backyard. Since 2006, our Chapter has donated \$37,600 to conservation organizations across the world, including Bowling for Rhinos. In 2013, we became the host Chapter for the keeper-led initiative Chopsticks for Salamanders.

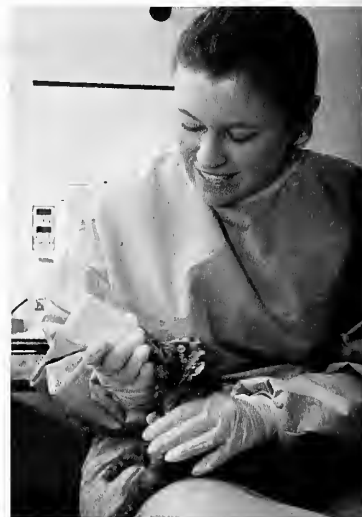
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Get involved with Chopsticks for Salamanders at www.chopsticksforsalamanders.org.

Learn about the National Zoo and the Smithsonian Conservation Biology Institute at www.nationalzoo.si.edu/SCBI.



COMING EVENTS

August 7-10, 2013

11th Annual Symposium on the Conservation and Biology of Tortoises and Freshwater Turtles

Co-hosted by the Turtle Survival Alliance and the IUCN-TFTSG in St. Louis, Missouri. Please visit turtlesurvival.org for more information, or contact Heather Lowe at Hlowe@turtlesurvival.org.



**September 2-6, 2013
International Penguin Conference**

Hosted by the University of Bristol, UK. For more information go to: combine.cs.bris.ac.uk/ipc

**September 5-9, 2013
(AZVT) Association of Zoo Vet Technicians National Conference**

Hosted by Alaska Sealife Center, Seward, Alaska. For more information go to: www.azvt.org

**September 15-20, 2013
(IBA) International Conference on Bear Research and Management**

Hosted by Brigham Young University, Provo, UT. For more information go to: <http://ce.byu.edu/cw/bear/>

**September 22-26, 2013
AAZK NATIONAL CONFERENCE**

Hosted by North Carolina Zoo and North Carolina AAZK Chapter, Asheboro, NC. For more information go to: ncaazk.com/2013nationalconference.htm

**October 3-6, 2013
Advancing Bear Care 2013**

Woodlands Wildlife Refuge, Clinton, NJ. For more information visit bearcaregroup.org

**October 14-16, 2013
Orangutan SSP Husbandry Workshop**

Los Angeles Zoo & Botanical Gardens in Los Angeles, California. For more information go to: lazoo.org/orangutansssp2013

**October 15-18, 2013
(ICEE) International Conference on Environmental Enrichment**

Hosted by the National Zoological Gardens of South Africa. For more information go to: <http://www.nzg.ac.za/icee2013/>

**October 24-27, 2013
From Good Care to Great Welfare Presented by the Center for Zoo Animal Welfare, Detroit Zoological Society**

Limited scholarship opportunities available. For information contact: Elizabeth Arbaugh, Curator of Animal Welfare, Detroit Zoological Society. E-mail: czaw@dzs.org

**November 10-14, 2013
Zoological Association of America (ZAA) Annual Conference**

Phoenix, AZ. For more information go to zaa.org. Deadline for abstracts is April 1, 2013.

**April 13-18, 2014
ABMA's 14th Annual Conference**

Dallas, TX. For more information go to: theabma.org





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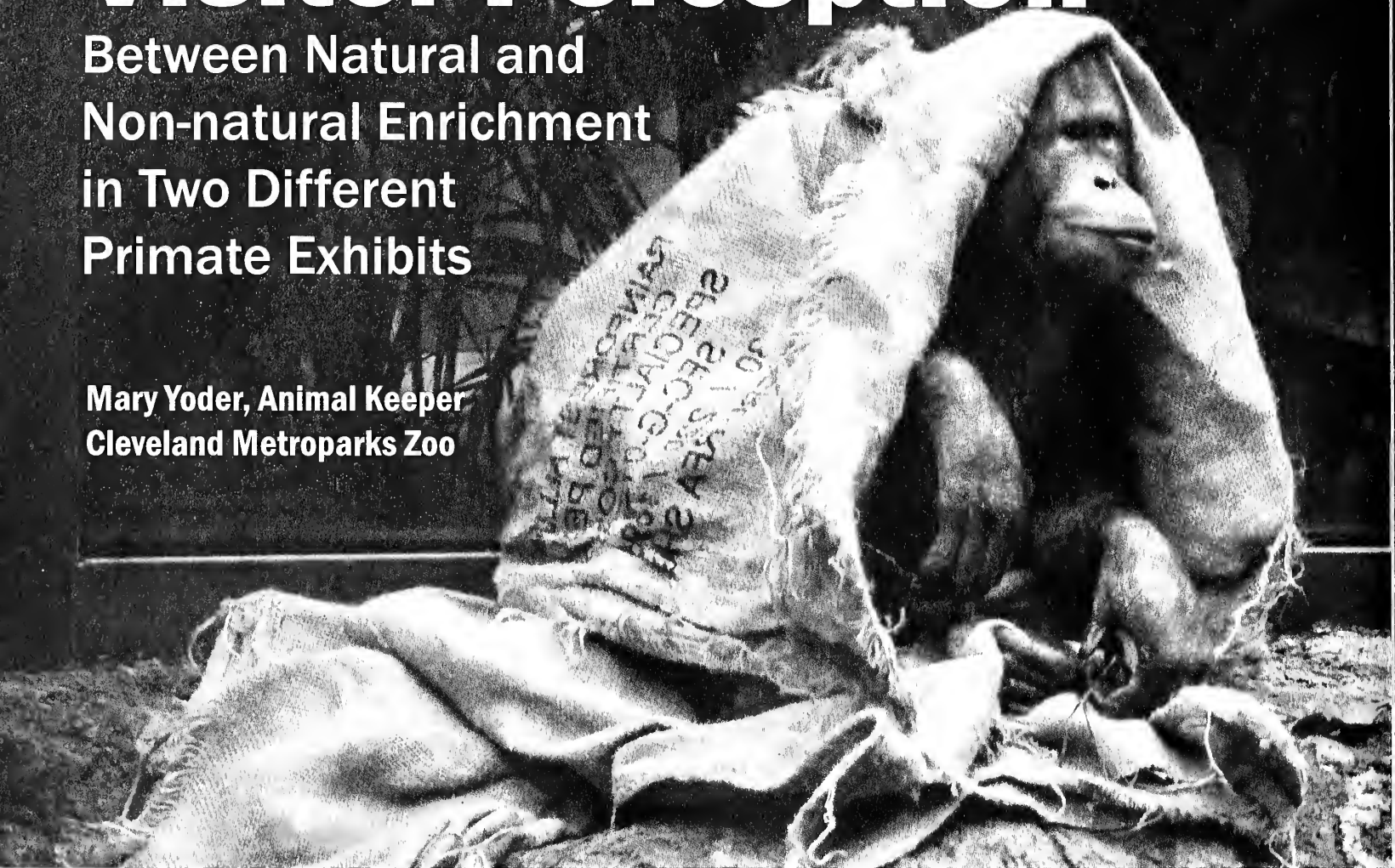
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A Comparative Study of Visitor Perception

Between Natural and Non-natural Enrichment in Two Different Primate Exhibits

Mary Yoder, Animal Keeper
Cleveland Metroparks Zoo



ABSTRACT

In the last few decades there has been much controversy in zoos as to whether or not the addition of non-natural enrichment in animal exhibits should be permitted. Animal enrichment is a key component for maintaining and encouraging natural behaviors while animals are housed in a captive environment. Enrichment can take on a variety of forms ranging from natural, which includes bedding, such as straw or burlap sacks, to non-natural, resembling large toys or puzzle feeders which are essentially man-made objects that require manipulating in order for the food to be retrieved. Unfortunately, there is little documented evidence on how the public perceives non-natural enrichment in zoo exhibits as it relates to animal health and the “naturalism” of the exhibit. This study used a survey to compare visitor perception of natural and non-natural enrichment in two very different primate enclosures; a concrete Bornean Orangutan (*Pongo pygmaeus*) exhibit and a vegetated Francois Langur (*Trachypithecus francoisi*) exhibit. The purpose was to determine which had a greater effect on a zoo visitor’s perception of quality animal care; an exhibit with natural or non-natural enrichment. The study also assessed which enrichment type the public preferred to see in an exhibit. The results of this study proved that there was no notable difference in public perception between non-natural and natural enrichment.

INTRODUCTION

Zoos play an important role in educating the public about conservation initiatives and raising awareness about species in danger of extinction. One of the many ways that zoos connect visitors to the animals is through the placement of environmental enrichment in animal exhibits. Enrichment can be defined as anything that promotes natural behaviors as well as discouraging abnormal behaviors (McPhee et al., 1998). Enrichment can be designed into the exhibit, but typically most enrichment devices are added and removed daily (Markowitz & Aday, 1998).

Environmental enrichment involves adding objects into exhibits that promote natural behaviors. These items can take on a variety of forms such as bedding, browse or vegetation, spices, and other natural-looking objects, or the enrichment can be non-natural or man-made items, which include puzzle feeders, boxes, and other toys. Due to enrichment enhancing an animal’s natural behavior, visitors watching animals interact with enrichment devices can often lead to learning opportunities for the guest, while at the same time making the education process enjoyable (Tofield et al., 2003).

Typically, most zoos have enrichment plans that are based on a species natural history and involve increasing the animal's behavioral choices. Depending upon the zoo, some management practices allow only natural enrichment to be displayed. These policies are due to an underlying and untested assumption that non-natural enrichment devices within an exhibit negatively affects the visitor's perception of the exhibit and can weaken the educational message about the species (Hutchins et al., 1979, Hancocks, 1980, Shepherdson, 1989). There also tends to be more resistance towards putting non-natural enrichment in exhibits that are more naturalistic in appearance, such as those with plants and vines. Unfortunately, allowing only natural enrichment into animal exhibits limits the options for enrichment variety, which can negatively affect the animal.

A study conducted by Reade and Waran (1996) concerning visitor perception of enrichment in animal exhibits showed zoo visitors rated the provision of daily enrichment to be highly important, regardless of trying to maintain a naturalistic exhibit. McPhee et al. (1998) and Kutska (2008) reaffirmed this stance by documenting that enrichment objects generally had little impact on zoo visitors' opinions concerning animal exhibits, but rather being able to see the animal was most important.

Connecting visitors to animals is a key component of many zoos, and research has shown that visitors take pleasure in coming to the zoo to experience captive wildlife, which thereby helps to shape their environmental awareness (Fraser et al., 2007). Understanding visitor perception and expectations of zoos is an important aspect to developing educational messages regarding animal exhibits (Kutska, 2008). Enrichment is often used to showcase the animal in a way that keeps the visitor engaged and compels them to consider their personal ethical values in relation to the environment and wildlife (Fraser et. al., 2007).

As zoos continue to place importance on enrichment in exhibits, questions about visitor perception need to be addressed. Currently, there are many studies documenting how enrichment affects animal welfare; however, there are few studies that focus on visitor perception of enrichment. Therefore, a study was designed and visitors were surveyed comparing two very different primate exhibits, one concrete and the other vegetated, to determine which had a greater effect on a visitor's perception of quality animal care; an exhibit with natural or non-natural enrichment. The study also assessed which type of enrichment the public preferred to see in an exhibit. Based upon the research of Kutska (2008) and MacPhee et al. (1998) the prediction was made that the public would view both enrichment types positively, with a potential preference to non-natural enrichment, as well as viewing quality animal care as equal.

METHODS

Within the Rainforest at the Cleveland Metroparks Zoo, two exhibits located across from each other were chosen to be the study sites. The Orangutan exhibit was selected, as it is a non-natural, concrete exhibit, and the François Langur exhibit was chosen because it has real plants and painted foliage on the walls giving it a more naturalistic appearance.

The survey was comprised of five statements using a five-point scale from strongly agree (1) to strongly disagree (5) concerning the visitor's perceptions on the enrichment within the animal



What do you think? Negatively affecting visitor perceptions with non-natural enrichment or engaging visitors with natural foraging?

exhibit. The same survey was conducted for both natural and non-natural enrichment. The five statements are as follows:

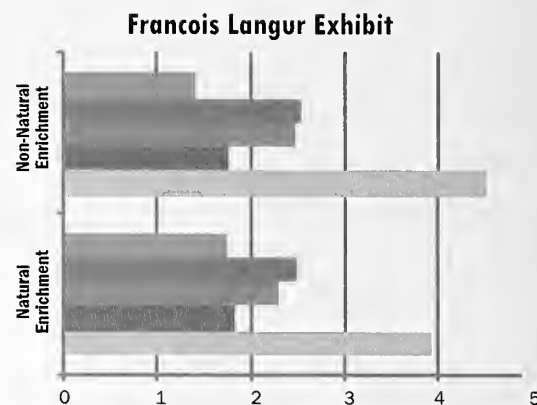
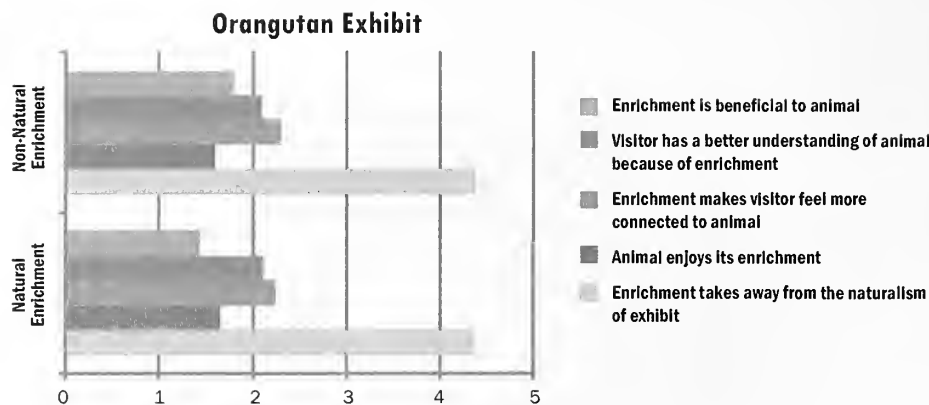
1. I feel the enrichment takes away from the naturalism of the exhibit.
2. The animal enjoys its enrichment.
3. The enrichment makes me feel more connected to the animal.
4. I have a better understanding of the animal due to its use of enrichment.
5. I feel that the enrichment is beneficial to the animal.

The study began on September 4, 2011 and ended on November 24, 2011. Due to time constraints and other variables, the enrichment survey for the François Langur exhibit was conducted online using a one-minute video of the animal playing

Based upon this study, visitors are more concerned with the animal's welfare, as well as being able to view the animal up close, rather than the type of enrichment within the exhibit.

with the enrichment. A link to the two different YouTube videos, one with natural enrichment, (www.youtube.com/watch?v=l8mb8K8Mk0A) and one non-natural, (www.youtube.com/watch?v=En9P9DHXLv0) was sent to various people using Facebook (www.facebook.com) and e-mail. The surveys obtained in front of the Orangutan exhibit were administered orally by either the keeper or the educational docent, who was trained on how to properly conduct the survey.

The natural enrichment for the François Langurs consisted of hanging willow branches, and the non-natural enrichment was comprised of puzzle feeders with grapes hanging from perching. Browse, herbs, and wood-wool were used for the natural enrichment within the Orangutan exhibit, and forage feeders and boxes were strung up with rope for non-natural enrichment.



Figures 1 & 2. Comparison of non-natural vs. natural enrichment in the Orangutan and Francois Langur exhibits, using a 1-5 point scale with 1 representing strongly agree and 5 strongly disagree.

Regarding the Orangutan enrichment, 82 surveys were completed for non-natural enrichment and 41 surveys were tallied for natural enrichment. The surveys for the Francois Langurs totaled 38 for non-natural enrichment and 54 for natural enrichment. Once all the data were collected, the Fisher's exact test was used to determine statistical levels of significance (McDonald, 2009).

RESULTS

Only two percent of people surveyed felt that the non-natural enrichment in the Orangutan exhibit took away from the naturalism of the exhibit, whereas three percent of people thought the natural enrichment took away from the naturalism of the exhibit. Seven percent of visitors perceived the non-natural enrichment in the Francois Langur exhibit took away from the naturalism of it, and 13% believed the natural enrichment made the exhibit look less natural. This was the only statistically significant result from all the data collected, and even then it was only slightly significant with a p value of 0.063.

One hundred percent of people agreed that the natural enrichment was beneficial to both the Francois Langurs and Orangutans. Ninety-nine percent of visitors thought that the non-natural enrichment provided to the Orangutans was beneficial and 96% of people perceived the non-natural enrichment for the Langurs as being beneficial to the animals.

About one third of the visitors commented that they would like to see the entire Orangutan exhibit look more natural and be vegetated. The comments regarding the naturalism of the Orangutan exhibit was not a question on the survey, but rather the visitor taking the survey, unprompted, offered this information. Visitors who viewed the Francois Langurs playing with puzzle feeders commented that although the items would not have existed in the jungle, it added more interest to the visitors than what it took away in naturalism. A few surveyors also commented, regarding the Francois Langurs playing with the puzzle feeders, that it was fascinating to see the animal's reasoning skills in use.

DISCUSSION/CONCLUSIONS

It is interesting to note that there was only a small difference in visitor perception between non-natural and natural enrichment in animal exhibits. These findings are particularly evident in regards to the Orangutans as seen in Figure 1. If anything, visitors perceived natural enrichment to have a slightly more negative effect on the "naturalism" of an exhibit. Surveyor's opinion of natural exhibitory was also more affected by

enrichment in the vegetated exhibit of the Francois Langurs, rather than the concrete Orangutan exhibit as evident from the results of the Fisher's exact test ($p=0.063$). It is unclear as to why the natural enrichment would actually take away the perceived naturalism of a more natural exhibit, rather than non-natural enrichment in a natural exhibit. However, McPhee et al. (1998) discovered similar results in their study of environmental



Surprisingly, natural enrichment had a slightly more negative effect on the naturalism scores of an exhibit.

enrichment in exhibits, noting that, "In the vegetated grotto, the exhibit with non-natural objects received higher naturalism scores than an exhibit with natural enrichment" (p. 528).

Overall, visitors enjoyed watching the animals play with the enrichment and their opinions of the animals were not affected by enrichment type. As mentioned earlier, the public enjoyed seeing the Orangutans and Langurs up-close and many made comments about the enrichment allowing them to get a better look at the animal. Without enrichment strung up in the exhibit, the Orangutans tend to spend most of their time on the second level of the exhibit, which is out of public view.

The decision to use two different survey methods, one with video and one in person, did not seem to produce significantly different results. However, another study conducted using the same survey approach should eliminate this as a variable. Also, a study done during the summer months when the Rainforest receives additional visitors would ensure a larger sample size and more comparable data. Measuring visitor stay time in front of an exhibit with varying enrichment would also enhance this study. Unfortunately, this was not incorporated due to a lack of manpower and time.



Enrichment items frozen in ice

Based upon this study, visitors are more concerned with the animal's welfare, as well as being able to view the animal up close, rather than the type of enrichment within the exhibit. Currently, the Cleveland Metroparks Zoo allows non-natural enrichment within animal exhibits. The keepers make an effort to use minimal cardboard or paper in newer animal exhibits that are vegetated or more naturalistic in appearance, compared to older exhibits that are more rustic. It is important to change out the enrichment daily, so boxes and other items do not sit in the exhibits too long and become "furniture." Another important element of adding enrichment in with the animals is using the opportunity to engage visitors in conversation. Many people do not know the definition of enrichment, but taking the time to describe its benefits along with important information regarding the species is a key component of many zoos.

Several zoos still perceive non-natural enrichment in animal exhibits as taking away from the educational message zoos are trying to convey; however, as evident in this study, as well as MacPhee et al. (1998) and Kutska's (2008) studies, visitor perception is not altered based on enrichment type in exhibits. As zoos continue to play a significant role on educating the public about conservation messages, visitor perceptions and motivations need to be studied to ensure that the public is walking away with a positive experience after viewing animals on exhibit. The use of enrichment has been proven to enhance animal welfare, and as more options of enrichment variety are available, the better-equipped animal care staff will be providing exemplary care to its collection. Hopefully, as more studies are conducted concerning the perception of visitors regarding enrichment type, more zoos will consider allowing non-natural enrichment to be offered to their animal collection.

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**Natural or
Non-Natural?
What do you think?**

Submit your Letter to
the Editor to
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The Successful Mixing of Two Banded Mongoose Colonies Using Vick's Vapor Rub®

Nancee Hutchinson, Lead Small Carnivore Keeper
Fort Wayne Children's Zoo

In May of 2011, we had to divide one of our two banded mongoose (*Mungos mungo*) colonies into two smaller colonies due to an injury to a tail. After several failed attempts to reintroduce the two smaller colonies back together the decision was made to leave them separated until a new method of reintroduction could be devised. After a lot of research and monitoring of behavior, a new method was developed to mix the two smaller colonies using Vick's Vapor Rub® to basically "erase" their identities. This new method was successfully performed at the end of September 2011, and all the mongoose have been living together peacefully ever since.

The Fort Wayne Children's Zoo currently houses 13.12 banded mongoose. These animals are divided into two colonies. The Kijani colony consists of 8.5 banded mongoose and the Zambarau colony is comprised of 5.7 banded mongoose. One afternoon, Sasa, a female from the Zambarau colony, injured her tail during an altercation with a conspecific and was left separated for the night to keep the other mongoose from chewing on it. The next day a couple mongoose from her colony were successfully mixed back with her during the day, but were separated again overnight. However, the next attempt at mixing was not so successful. Shortly after mixing, a female named Bendi started attacking Sasa which resulted in a keeper having to physically separate them. Later that day three other conspecifics were mixed back with Sasa and they remained together overnight. The next day a few

more mongoose were mixed back with Sasa, but at one point other females were picking on her and Sasa had to be separated out once again. At the end of the day four other mongoose were mixed back with her and the group of five was left together overnight. The next day a mongoose from her old Zambarau colony in an adjacent pen was able to pull Sasa's tail under the caging and started chewing on it, further injuring her tail. At this point the Zambarau group of 5.7 was divided into two colonies: a group of 5.2 mongoose including Sasa, and a group of 0.5 mongoose. These two colonies were left separated for 10 days until all aggression between the two colonies through the enclosure mesh seemed to have subsided. At this point we attempted to mix more mongoose back in with Sasa. A female named Kundi was mixed back with Sasa's

both smaller colonies with no aggression. So until another method of mixing could be developed these two colonies were left separated.

During the few months that the two Zambarau colonies were left separated they were always housed on opposite sides of the enclosure mesh so that they could always see, smell and hear each other, but there continued to be intermittent fighting through the cage wiring. There were also a couple of routine vet procedures during this time that resulted in successful reintroduction of the individual back into its respective colony. The method of reintroduction used following each vet procedure is to spray any non-toxic chemicals used on the animal during the procedure, such as Nolvasan®, all over the other mongoose and the holding area. This helps the reintroduction process by making the smell familiar and neutral before mixing. After spraying the solution around the holding area the mongoose are then slowly mixed back one at a time in with the rest of the colony, starting with less dominant mongoose, if possible.

Throughout my research I read on a listserv how one European zoo was able to use Vick's Vapor Rub® to successfully mix two meerkat colonies together, and so I decided to try this method of mixing for our

two smaller groups of banded mongoose. As a test, I smeared a little Vick's Vapor Rub® on the floor of a pen to see what reaction the mongoose would have to it, and immediately all the mongoose started rolling around in it and did not seem to be




Introducing a new mongoose to an existing colony can be a challenge.

group and fairly quickly after doing so a fight broke out between the two, so Kundi was separated back out. It was observed that the other females from Sasa's colony seemed to be the ones fighting with her, and the males could freely be mixed into

bothered by the smell at all. It was decided that the mixing would occur on the same day as a scheduled immobilization for six of our females to receive their Deslorelin birth control implants. That morning, in preparation for the mixing, the entire building was disinfected thoroughly to remove as much of their scent as possible. Plenty of enrichment and puzzle feeders were given to help distract and entertain the mongoose. While the animals were immobilized, staff was able to rub Vick's Vapor Rub® on the bodies and noses of the mongoose, and also on the inside of their catchboxes. The mongoose that we did not transport to the vet hospital were caught up individually in catchboxes that were already coated in Vick's Vapor Rub®. We were able to apply more Vick's Vapor Rub® to their noses when they stuck their noses through the one-inch diameter hole in the catchbox door. They also all were sprayed with a Vick's Vapor Rub® solution through the enclosure wire. One solution was made by soaking Vick's Vapor Pads® in water and the other solution was made by mixing Vick's Vapor Liquid® with water. Both solutions worked well, but the solution made from soaking the Vick's Vapor Pads®

seemed to be a little stronger smelling. Once the vet procedures were completed and all of the mongoose were returned to the mongoose holding area, we smeared Vick's Vapor Rub® around all the pens. We also sprayed the Vick's Vapor Rub® solution around all the pens and had a Vick's Vaporizer® running to emit the smell into the air in the building. At this point all of the mongoose and everything in the building smelled like Vick's Vapor Rub® and it was time to mix. We began by mixing one mongoose back in at a time and monitored closely for any fighting. The less dominant mongoose were mixed in first, followed by the more dominant ones. If we did see the start of any fighting we would spray them with the Vick's Vapor Rub® solution and that seemed to break up any fights. Immediately after mixing there was a lot of communal scent marking all over each other and everything in their enclosure. After several minutes of close monitoring, once everyone seemed to be getting along well we would mix another mongoose back in. At one point a fight broke out between two mongoose that lasted about two minutes that required the mongoose to be physically separated

by the keeper. After being left separated for some time so they could calm down, they were again mixed together and this time there were no incidents of aggression. Overall, the mixing went very well and by that afternoon all twelve mongoose were sleeping together in a giant heap.

Banded mongoose rely heavily upon scent for identification of other mongoose and things in their environment. By masking each individual's scent using Vick's Vapor Rub®, we were able to basically "erase" the identity of the different mongoose and successfully mix the two smaller colonies back into one colony. When they were initially mixed together they scent marked all over each other, which resulted in all the mongoose smelling the same, and therefore individuals could no longer distinguish who was from which colony. This mixing method seemed to work extremely well and at the time this article is being written the mongoose have been living together in one big, happy colony for over eight months with no more aggression seen. 



**Banded mongoose
are social animals and
rely heavily upon scent**

Multiple Snakes, Multiple Problems

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Reptile Discovery Center, National Zoological Park,
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The staff at the Smithsonian National Zoological Park, much like other institutions, works hard to create exciting and interactive exhibits. At the Reptile Discovery Center we exhibit three juvenile false water cobras (*Hydrodynastes gigas*) together, achieving our goal of creating an active exhibit. False water cobras are rear-fanged, venomous colubrids that are a fairly active, diurnal species. As such, these snakes are treated as other venomous snakes in the collection. They are hooked out of the enclosure for cleaning and separated for feedings. Hooking these snakes out of the exhibit would be a daunting task, especially during feedings because all three snakes are extremely active and aggressive feeders. To ease the daily and weekly maintenance of this exhibit the animals were trained to trail a blue and white buoy out of their enclosure (Figure 1) and into individual cans, which are typically used for snake holding and feeding.

These snakes arrived at the Reptile Discovery Center on 5 August 2012 and were placed in an exhibit measuring four by six feet. Training began immediately after the animals arrived, as the primary keeper (JG) found training to be a less stressful management technique then hooking all three lively snakes out of the exhibit. A blue and white buoy at the end of an appropriately lengthen dowel rod is used as a target stick. When working with venomous species it is important that the tools are of a suitable size in comparison to snake length (Altimari, 1998). The snakes are approximately four feet long and the dowel rod used is a little over three feet long with the buoy on the end (Figure 2). A can with some type of perching (cork bark or a branch) and three dead mice in the bottom is placed at the keeper access door to the exhibit, still leaving space for the keeper to safely manipulate the snakes if needed. The keeper always has one hook in hand and a second hook is in close proximity. The buoy is rubbed on a mouse to scent the target, which is then presented to the snake closest to the exhibit door. The snake immediately trails the buoy into the can. Once in the can, the snake is secured and the exhibit door is closed. The next can is placed outside the exhibit and the door is safely opened with a hook. The next snake is presented with the buoy, contained and then the third.

From the first time these snakes were presented with the scented target, they quickly followed it. Occasionally the snakes will hang the majority of their bodies into the can, while still holding on to the door-frame of the exhibit with their tails, as the bottom of the can is a three-foot drop. At this point, the keeper hooks the remainder of the snake into the can.

Keepers have noticed some interesting behaviors during training. The snakes almost always exit the exhibit in the same order, snake A, B and then C. This may suggest a dominance hierarchy within the group which has been described for pythons (Barker et al. 1979). In one instance, when attempting to shift the animals into the can, JG noticed two snakes, A and B, alert and facing the door. She decided to present the target anyway, but removed the mice from the can, anticipating that both snakes would respond by crawling into the can. Snake A responded immediately and advanced toward the target and crawled into the can. Snake B did not move. The keeper fed and secured snake A and went back to train Snake B, who immediately followed the target into the next can. From this point forward mice were no longer put in the can before the snake, to prevent injury due to food aggression. The snakes are shifted and then fed. Once each animal has finished its meal, each snake is allowed to climb back into its exhibit from the can. Often a keeper will facilitate by hooking the animal, but in most cases the animals move themselves back on to exhibit using the cork bark or branch.

**The snakes almost always exit the exhibit
in the same order...This may suggest a
dominance hierarchy within the group...**

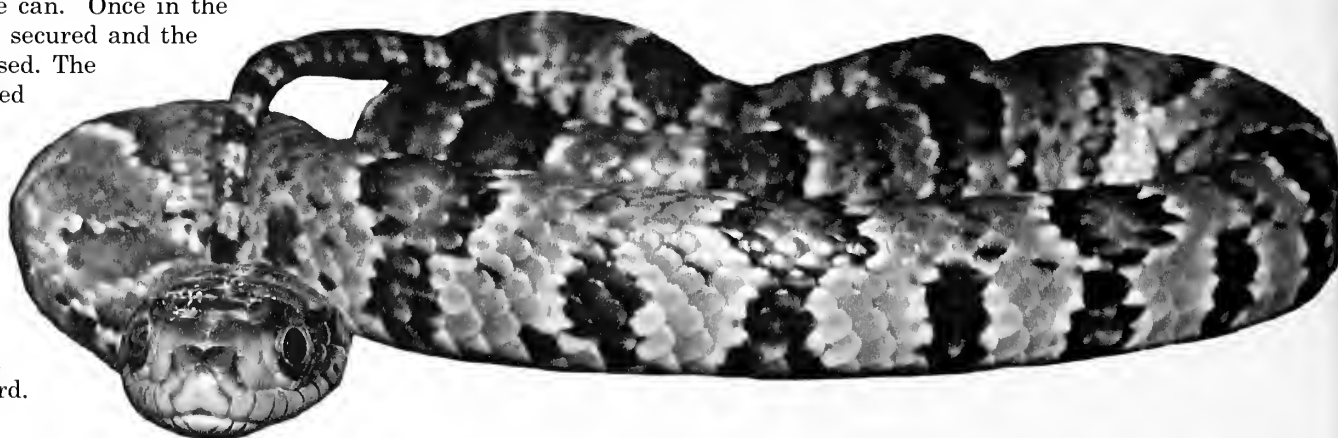




Figure 1: Snake following target pole out of exhibit



Figure 2: Following target into can..



Figure 3: Snake entering can for feeding.

On 30 May 2012 it was decided to stop scenting the target and twelve days later the snakes were presented with an unscented target for the first time. All three snakes performed the behavior impeccably.

The benefits of training these three snakes to individually follow a target outside of their enclosure and crawl into a secure can are numerous. Primarily, this training increases the safety of working with these animals. Attempting to hook a lively snake with two other snakes in close proximity can be risky. The extra excitement can cause snakebites, injury or even accidental escapes. Additionally, this training reduced the amount of handling and stressful interactions between the keeper and the animals. By training these snakes to follow the target into a can for food, the keeper no longer has to hook them out of the enclosure (Figure 3). Lastly, this training greatly reduced the amount of time needed to manipulate these snakes for maintenance and feedings.

We look forward to continuing this training and hope that this paper encourages other reptile keepers to utilize operant conditioning when working with snakes. It is important to thoroughly understand the natural history of the snake species when attempting to train this behavior. Although this works for our animals, it may not be feasible with all snake species. Safety should always be any animal keeper's first concern. Take the proper precautions when attempting to train any dangerous animals and make sure to follow your institution's procedures when attempting this type of training.

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BHC comments by Jay Pratte:

Reading this Tale left me super-excited about the creativity we see evolving in zoological facilities in regard to training and enrichment, particularly in areas that may not historically rely as heavily on these techniques for animal management. While we read periodic accounts of excellent reptile training, it is not as prevalent as we see in the worlds of mammals and birds. It is heartening to see this evolution of approach.

That being said, the authors have clearly outlined the steps taken in achieving the training goals: knowing the natural history of the species, accounting for exhibit and population dynamics, and all with a very clear level of detail for safety. Not just safety for the staff training/handling the animals, but also the animals themselves. Recognizing a shifting pattern and respecting it is an excellent approach for any species, and while it is one taken for granted in social groups like primates and even hoofstock, it may be less expected in reptiles. The trainers have done an amazing job of considering all aspects of training. Also, by beginning with the animals when they are younger, there are fewer "undesirable" behaviors to unlearn, and the training will stay with them throughout their lives with appropriate ongoing reinforcement.

Lastly, I want to point out the documented transition from "luring/baiting" (mice in the bottom of the cans) to a true cue->behavior->reward scenario. By the end of the Tale it is clear the snakes are following the target and exhibiting a trained behavior, and not just following a trail to the food. Great job, and very inspiring! 🐍

*This article was also featured in ABMA's Wellsprings
Volume 13 (1): 9-10.*

Contra Freeloading

(Working for Food) at the Phoenix Zoo

Hilda Tresz

Behavioral Manager, The Phoenix Zoo

Although contra freeloadng (against free feeding) is not a new concept, it is not very well known and practiced in captive nonhuman animal care. Animals show a preference to work for their food in the presence of identical freely available food items. In theory, it is self-reinforcing and allows them to perform certain species-typical behaviors. In the wild, "working for food" is one of the most frequently observed species-typical, time-consuming behaviors, yet many captive animals are deprived of this stimulation. It is our strong belief that foraging programs should require animals to "work" for food items to help elicit these natural behaviors. The Phoenix Zoo promotes contra freeloadng in its management practice. Request for reprints should be sent to Hilda Tresz, Behavioral Manager, The Phoenix Zoo, 455 N. Galvin Pkwy, Phoenix, AZ, 85008, USA. E-mail: htresz@thephxzoo.com What is contra freeloadng? It is common that nonhuman animals show a preference to work for their food in the presence of identical, freely-available items. Animals have an "apparent behavioral need" to forage (Dolins, 1999, p.85). It is self-reinforcing (finding after seeking promotes additional seeking) and allows them to perform certain species-typical behaviors.

Contra freeloadng is not a new concept!

Robert Yerkes wrote in 1925 that "The greatest possibility for improvement in our provision for captive primates lies in the invention and installation of apparatus which can be used for play or work." (Tudge, 1992). This phenomenon was later explored in several studies. In 1986, Inghish and Ferguson found that "starlings preferred to obtain 72% of their food by working (extrinsic exploration) even though identical food items were freely available" (Day, J.E.L.; Kyriazakis, I. & Rogers, P.J., 1998). Another study "provided 9 adult male Mongolian gerbils with the choice of

digging for 30 sunflower seeds buried in a dish of sand, or eating from 1000 identical seeds which were given freely available in another dish. The gerbils preferred to obtain, on average 67% of their food by digging" (Forkman 1993).

Why is working for food important?

Non-food related enrichments such as sensory and manipulative items, structure and substrate, etc. are extremely important but are short-term enrichments. Gustatory enrichment (as part of sensory enrichment) that offers novelty food items, only provides short-term eating behaviors as well. In the wild, working for food is one of the most frequently found species-typical, time-consuming behaviors. In various situations animals prefer to work for food even when free food is available. Several hypotheses have been put forward to explain this phenomenon, most of them either suggesting that a learned behavior may be self-reinforcing or that the animal has an intrinsic need to perform a certain species-specific behavior (Forkman, 1993). "Foraging is a time-consuming process including searching for, retrieving or acquiring, and processing food. Foraging does not equal eating!" (Tresz, 2007). Feeding schedules often only allow animals to eat but not to forage. Therefore, foraging programs should require captive animals to "work" for their food items, concentrating on offering the original prescribed diet first and novelty food items as well, if available.

Phoenix Zoo's definition of contra freeloadng

Contra freeloadng by exact translation means against free feeding (against exploitation of freely accessible food). By necessity, zoos do employ some free feeding; therefore modifying the strict meaning of contra freeloadng was necessary within zoo settings to reach truthful and positive goals. In Phoenix, not all animals were equally part of the program and/or had the opportunity of choosing to work for their food when at the same time free food was available. Sometimes diet was offered only by contra freeloadng (feeding devices, in substrates, behind and under furniture, smeared onto walls, etc. or just simply scattered in very small pieces). Other times animals had both options (working for food and free feeding). Depending on feeding schedules and their time frames, every so often only novelty food items (such as enrichment diet) were offered via contra freeloadng. Often the texture of the diet was changed to extend foraging time (pureed and frozen diets were given, for example). Geriatric and disabled animals (due to reduced eye sight or complete blindness, arthritis, tooth problems, missing limbs, etc.) were not always offered manipulative devices. Animals that required veterinary care or specially prepared diets were sometimes temporarily excused from the program.

Therefore, a new definition better suiting the Phoenix Zoo's program was developed: contra freeloadng was defined as "diet offered with the help of different devices, substrates, locations,



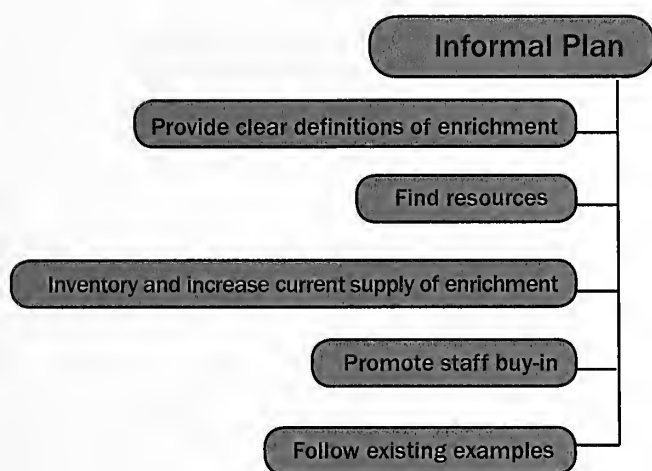
Cricket feeders promote natural foraging.

and preparation to decrease or completely eliminate free feeding in order to extend foraging time.”

Institutional goal: Contra freeloading as a minimum standard + additional daily regular enrichment

Randomly offered puzzle feeders, diet in substrates, and/or offering hidden food items to help animals forage longer, etc. were already a well known practice at the Phoenix Zoo, with the key word being “randomly.” The program had to be further evolved and structured. It was decided that foraging enrichment, when provided only as part of enrichment schedules, was no longer sufficient. Contra freeloading was to be elevated to a minimum standard practice accompanied by non-food related enrichment items that are offered daily as well when possible. The long term goal was divided into two phases: informal and formal plans.

Providing clear definitions of enrichment and its categories and further defining contra freeloading



Enrichment items can serve several purposes. For example: puzzle feeders need to be worked by the animal in order to gain food. Should the feeder be considered foraging enrichment or a manipulative device? To distinguish between categories, staff members were asked to try to determine the main purpose of the enrichment. We set an example to help decide: if a person is grocery shopping and at the same time chews gum; is the person grocery shopping or chewing gum? Obviously, the main purpose is to grocery shop, regardless of whether the person is chewing gum or not (or might have to drive and then walk, open and close doors, grab a cart and all other behaviors that are being performed while shopping).

To follow this logic, all definitions that could have been cataloged into several categories were clarified and redefined to fit into only one group. This system also further helped with cataloging and searching for enrichment items. The following six categories were outlined:

1) Foraging enrichment:

Foraging is a time-consuming event involving searching for food, retrieving or acquiring food, and processing food. To promote psychological well-being it is important to increase processing time (contra freeloading = working for food), stimulate the senses by providing diet other than what is typically fed (variety of food and consistency of food), and periodically change the availability of food in time and space (varying feeding time and



location of food).

A variety of foraging devices can be utilized, although the type of device should be appropriate for the species, age group, and individual preferences. Items cataloged under foraging include:

- Forage presentation/placement: hiding, scattering food, puzzle feeders (plastic containers, suet baskets, Boomer Ball® feeders, peg boards, etc., Kong® toys, paper or wooden boxes, burlap sacks, doormats, pine cones, etc.) - although substrates can elicit foraging behaviors, they will be grouped under Structure/Substrates
- Live prey
- Browse - herbs, flowers, buds, gum arabic, and other fresh plants that are consumed quickly and do not extend foraging time, but rather serve as different tastes, are catalogued under Sensory (Gustatory) enrichment. Novelty food items are categorized under Sensory (Gustatory) enrichment

2) Manipulanda:

Objects that can be moved, used, or altered (manipulated) in some manner by the animal. The item can be artificial or natural. Toys stimulated curiosity and may increase play and hunting behaviors; however, animals lose interest in or habituate to toys over time. Rotating toys and other objects on the basis of texture, shape, and color helps to maintain interest (NRC/ILAR 1998). Examples include objects without food with the sole intention of manipulation: fire hose balls, kegs, barrels, cardboard, piñatas, wheels, rubber toys, punching bags, feathers, clothing, balls (golf, tennis, Boomer Ball®, jungle and planet), rocks, wood, sea shells, pine cones, plastic or paper objects such as boxes, paper towel tubes, containers, etc.

3) Structure/ Substrate:

In order to accommodate species-appropriate behavior, enclosures need adequate space for resting, locomotion (terrestrial and/or arboreal as appropriate), and sanitation. The most basic component of the physical or inanimate environment is the enclosure structure (its size, shape, and design) and the substrate within it. In the enrichment context, structure refers to temporary furnishings such as perches and shelves, swings, ropes, ledges, nest boxes, culverts, water features (swimming pools, waterfalls turned on and off, etc.), branches and logs, hammocks, etc.

The term “substrate” commonly refers to the “base on which an organism lives” and would include flooring, artificial and natural turf, sand, gravel, mud, bedding/foraging materials (shredded paper, woodchip, leaves, hay, straw), etc.

4) Sensory enrichment or stimulating all five senses:

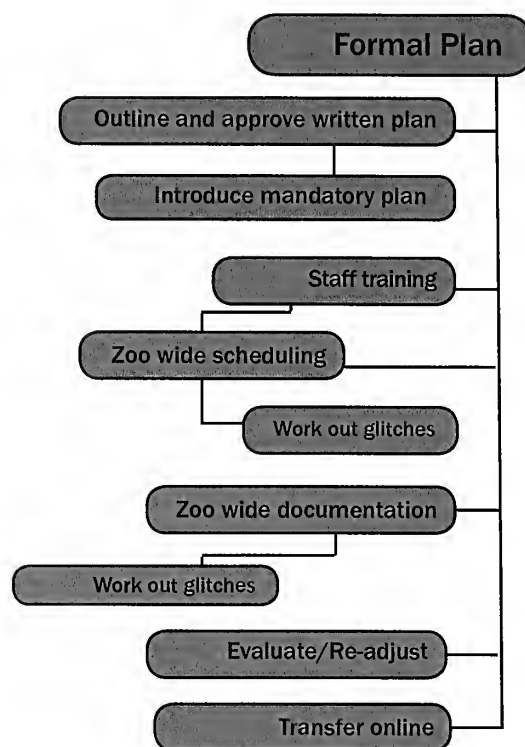
- Visual stimulation involves the use of color dyes, murals, cool-spectrum (green) lights, mirrors, motion (TV, video, DVD, video games), sun catchers, disco balls, etc.
- Auditory stimuli consists of vocalization from other animals, sounds from the natural environment, music, and nature sounds, etc.
- Tactile stimulation can be provided by touching and feeling inanimate objects such as scratching posts, scrub brushes, snake skins, etc., or changing the consistency of items (snow, bubbles, ice, etc.)
- Olfactory enrichments are spices, perfume, animal scents and lures, urine, feces, and extracts
- Gustatory enrichment differs from foraging enrichment by not necessarily increasing foraging time. Gustatory enrichment increases the variety of sensory characteristics:
 - » Different tastes (novelty food)
 - » Preparation of food
 - » Textures (pureed food)
 - » Consistency (frozen items)
 - » Size (whole or chopped)
 - » Color (food dyes)

5) Training:

May include classical and operant conditioning. Although training could be considered as a social enrichment, it was not grouped in this category because it is considered a more structured type of social enrichment.



An elephant uses its trunk to search for food in an enrichment device.



6) Social enrichment:

Stimulation can be provided by conspecifics and non-conspecifics (physical contact such as grooming, petting, verbal communication, etc.).

Finding resources to support the program

The Phoenix Zoo's monthly enrichment budget was not nearly enough to support such a high caliber program at a fast pace. The plan relied on donations as well. The Zoo's Women's Auxiliary (volunteer support group that has supported the zoo for decades) and the Guardians (Member support group) instantly offered their help and purchased a large amount of feeders and other foraging devices. Smaller donations were received from the City of Tolleson Fire Department, Boomer Ball® owner David Schultz and contributions from private individuals such as the Mitchell family.

Increase in current enrichment supply

A plan was developed by the end of 2006 to acquire as many foraging devices of different types as possible within the next two years. Behavioral Enrichment Committee Representatives (B.E. representatives) needed to complete an inventory and submit a list of enrichment items that needed to be purchased to complete the program.

Staff buy-in

At the beginning, the program was not mandatory and ideas were quietly filtered down the system. New items were introduced almost “one at a time,” accompanied with a lot of explanations and evaluated by constant feedback. Staff needed to become acclimated to the idea of offering either basic diet or novelty food enrichment via foraging devices on a daily basis.

Following of existing examples

Since elephant enrichment and most of the primate enrichment were up to standards since 2002, following their examples, the plan was to switch over all hoofstock, amphibians and reptiles, and new primate species to contra freeloading by 2007. Carnivores and birds were scheduled to be fully included by the end of 2008.

After all areas had the necessary tools to support the plan, the program became mandatory. The goal was to help the staff understand (and therefore not oppose) the new program, to schedule all enrichment as soon as possible, have staff and animals used to new enrichment ideas and their schedules, work out all glitches, have staff trained to fill out enrichment paperwork zoo-wide daily, and online, and to evaluate and re-adjust the program based on constant feedback.

Outlining and approving written plan

The contra freeloading master plan was finished and submitted for managerial approval on 06-18-08. The Living Collections Department at the Phoenix Zoo is divided into several trails and different strings (sections within trails). B.E. representatives had to submit a list of all species within all strings to the Behavioral Management Coordinator, and managers were asked to provide time for B.E. representatives to accomplish their tasks. The coordinator was tasked to create new enrichment log templates and to assign Behavior Observation Team (BOT) volunteers to duplicate these templates as master B.E. calendars. These calendars were cataloged by strings, and each worksheet included all species within that string. Each trail had 5-6 documents depending on the number of strings on their species cataloged under them.

Colors are used to categorize the species progress in the program. Green is used if animals were already transferred over to contra freeloading; natural color if animals have a weekly schedule but are not transferred over to contra freeloading yet; and red if animals have no weekly schedule made yet whatsoever. Primary keepers of strings and the B.E. representatives together fill out the blank schedules for the species or individual animals by using existing weekly/monthly schedules and enrichment approval log books. If an animal can not work for its food, keepers need to indicate the reasons. Sick, geriatric, or otherwise incapacitated animals are excluded from the program unless staff suggested otherwise. Program animals that received their entire diet through training are considered working for their food as-is, and do not necessarily need to be part of the program. Sometimes animals are only required to work for part of their diet.

The zoo continued to maintain USDA standards. For example, if an animal is to be fed from puzzle feeders in a way that would allow food to fall on the ground, then feeders need to be



All enrichment is scheduled, recorded and evaluated daily.



Domestic goats (*Capra aegagrus hircus*) and miniature zebu (*Bos taurus indicus*) rolling Boomer Ball® feeders in the Contact Yard – photo by Bridget Cardwell

hung above concrete areas, over grass areas, have rubber tubs under them, or be placed into troughs, etc. If animals (such as Galliformes) are to forage from substrates (pellets, or seeds in dry leaves, hay, straw, etc.), the substrate with diet needs to be offered in boxes, trays, tubs, etc. Feeders can also be constructed and filled the day before (if applicable) to save time.

New online schedules must be developed, with keepers indicating:

- How animals will work for their food (easy feeder, hay feeder, Boomer Ball® feeder, amazing graze, food in substrate, scatter diet, hide diet, whole prey, carcass feeding, food in paper products, insect feeders, etc.).
- What type of additional behavioral enrichment will be provided for the day
- Keeper's initials
- Enrichment rating and explanation

All animals that were currently being fed only from dishes and are therefore new to the concept of working for food are to be taught to search for their food. All types of enrichment listed on the monthly calendars must be evaluated by the rating scales or yearly by a more detailed format. If an animal had 50 different types of enrichment approved, staff can choose 10-20 of the best enrichments to evaluate yearly. The rest of the evaluations are scheduled as time allows. B.E. representatives are required to submit schedules to the behavioral management coordinator and area manager for review. Paper copies of monthly calendars are posted in each area as needed (by the night houses on clipboards, inside kitchen areas, wooden hay boxes, etc.) where they are safe from weather. Copies are collected by the B.E. representatives at the end of each month and scanned onto the zoo's shared computer network drive. Managers and the coordinator review the documentations monthly. Some areas (with smaller collections such as Animal Care Center, Equine, Avian Propagation Center, and Animal Resources) are required to document online and all larger areas are to be transferred online as soon as possible. Providing contra freeloading is a long process requiring team effort from inter- and intra-departmental staff and volunteer support. The Horticulture Department provides materials for bamboo and log

feeders, volunteers help to gather pine cones and plastic jars for bird feeders, the Operations Department helps with modifying plastic products and Fire Departments were asked to donate fire hoses for use as browse and meat feeders.

Introducing mandatory plan to all staff

After managerial approval, the program was introduced by an inspirational e-mail to all Living Collections Staff on 07-29-08 outlining the necessity of contra freeloaders, the goals of the program in greater detail, and assuring staff regarding the program's slow implementation and flexibility. It was determined that all schedules would be developed and transferred onto the new format by November 1, 2008.

Staff training

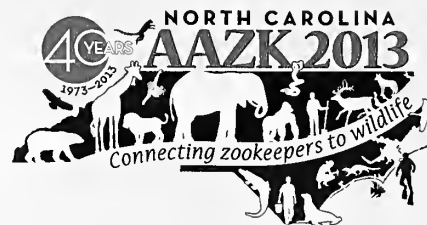
Staff training was done in several different levels:

- Directions via e-mail
- Coordinator training management staff during management meetings
- Coordinator training B.E. representatives during B.E. meetings
- B.E. representatives training keepers
- Coordinator training staff at all levels via e-mail or one on one
- Coordinator training volunteers one on one

Creating zoo-wide enrichment schedules

Creating templates — Coordinator and the B.E. representatives created new enrichment log templates, utilizing volunteer help

THE 2013 NATIONAL AAZK CONFERENCE WILL BE HELD IN GREENSBORO, NC FROM SEPTEMBER 22-26, 2013



The NC Chapter AAZK is excited to invite you to our little area of the country and show you some real southern hospitality, where you can get your tea sweetened and your little heart blessed. We have beaches and mountains and God liked us so much, he made the sky Carolina blue!

REGISTRATION

This year, registration will be offered online only. To register, please visit our website: www.ncaazk.com and click on "2013 National Conference". For registration questions, send e-mails to registration@ncaazk.com. Early registration deadline is August 15, 2013.

CHAPTER CHALLENGE

Help the North Carolina Chapter fund this year's conference and get a chance to win free registration and/or accommodations. Entries must be received by June 30th. Winning Chapters will be notified by July 12th. For more information e-mail: bsigafoos@nczoo.com.

EXHIBITOR INFORMATION

Exhibitors can be an AAZK Chapter, Conservation Partner, conservation organization or company that could use exposure in the zoo world. Please contact Brigitte Thompson at zukeepr14@hotmail.com for more information on becoming an exhibitor. Send faxes to 336-879-7637 (Attn: Gisela Wiggins)

AUCTION EVENTS

The 2013 Conference Committee is looking for items to be donated for both the Silent and Live Auctions. For any information on the auctions, please contact Brigitte Thompson at zukeepr14@hotmail.com.

SPONSORS

Sponsors are always needed at various levels. Please contact Brigitte Thompson at zukeepr14@hotmail.com for more information on becoming a sponsor.

PRE- & POST-CONFERENCE TRIPS

Duke Lemur Center and Durham Museum of Life and Science: September 22, 2013

DLC is a leader in conservation, education and research and houses over 22 species of lemur. The tour will include an extensive behind the scenes tour of the facilities and information on the animal care program. After the tour we will be getting lunch in Durham (included in fee) and heading to the Durham Museum of Life and Science. This facility includes a museum and an 84-acre interactive science park.

Sylvan Heights Bird Park, North Carolina Aquarium on Roanoke Island and the Nags Head, NC Coastal Area: September 19-20

Our first stop will be a tour of Sylvan Heights Bird Park where you will visit one of the world's largest bird collections. Then we will travel to Nags Head on the Outer Banks of NC, where we will explore coastal, ecological and historical landmarks, along with the North Carolina Aquarium on Roanoke Island for a tour of the facilities and lunch.

Asheville, NC Post-conference trip: September 27 & 28, 2013

The first stop will be the Biltmore Estate and Vineyards. Biltmore is the Vanderbilt family's 8,000-acre estate, the largest privately-owned home in the United States. The evening will include exploring beautiful Asheville and overnight accommodations (single and double occupancy available). The morning of the 28th participants will head to the Western Carolina Nature Center which features one of the largest collections of Southern Appalachian animal species in the world.

Y'ALL COME JOIN US AT THE 40TH ANNUAL AAZK NATIONAL CONFERENCE!

when needed. The templates needed to reflect both contra freeloaders and additional enrichment scheduled that day.

Creating schedules — Primary keepers of area strings... B.E. representatives and the coordinator prepared the new monthly schedules and submitted them for approval to area managers. Schedules were done by March 5, 2009.

Working out glitches during scheduling phase

Challenges (in regular type) and *solutions (in italics)*:

Convincing staff to use feeding devices instead of the usual food dishes

Some people believed that animals would never be able to find or retrieve their diets from the feeders and therefore only wished to risk additional, novelty food items. *Staff developed "training" feeders by, for example, making holes (temporarily) bigger for animals to succeed faster and easier. Once animals learned how to use the feeders, the holes went back to their original sizes by inserting the original rubber rings back.*

Training staff to be inventive

Some staff members were ready to quit ideas "cold turkey" the minute the enrichment did not seem to be successful. *Leading members of the program at all levels (managers, keepers, representatives, coordinator, etc.) had a great effect on convincing everyone to put extra effort into modifying ideas instead of abandoning them. If their encouragement failed, management stepped in and staff was required to brainstorm and improve the idea. Sentences such as "it is impossible, this will never work, it is useless," etc., were cast out of the vocabulary. Problems were evaluated until solutions were found. Staff needed to prove that every possible option was exhausted and only then were the ideas allowed to be abandoned with managerial approval.*

Desensitizing animals to new objects

Sometimes animals reacted to devices with fear, were not be able to comprehend how to use them, or became aggressive towards them. *New enrichment was introduced gradually, in a safe manner, and often was altered to better suit use. Most of the animals became accustomed to new enrichment quickly.*

Teaching animals how to search for food

Some animals had never been fed from anything but plastic, metal, or rubber dishes. They had never been asked to search for food; they acquired their diet easily and ate at a fast pace. *Bird Trail developed a program to teach birds that have always been fed by traditional food dishes to look under paper slices, wooden sticks, or dry leaves that covered their food. Starting out with one piece of shredded paper, gradually increasing to a handful, the birds learned searching behaviors fast and most of the time without much stress - with the exception of some raptors, when larger pieces of papers (up to two inches), though not covering*

food, stopped the birds from eating altogether. Attempts at using this enrichment became variable for these birds. Paper was discontinued later due to safety reasons (it stuck onto the food and was sometimes ingested together with diet) and only natural items such as edible leaves and sticks were used for covering food.

Frustrating the animals

Especially after a long wait, such as overnight, some animals (horses, rock hyrax, etc.) became frustrated when the morning diet was received in Boomer Ball® feeders and could not be ingested fast enough. Some horses simply left their diet in the balls and chose not to eat. *Horses were free-fed their pellets first thing in the morning and only after the animals returned from working (carriage rides, riding classes, etc.) were they required to work for their food by retrieving hay from puzzle feeders, for example. The hyrax was fed at least his morning and mid-day diet prior to being asked to work for some of his produce used as enrichment.*



Carcass-feeding is another way for carnivores to work for their meal.

Going too fast with introducing enrichment

Sometimes people did not realize that animals were at different stages in their learning. It was especially difficult for the relief keepers trying to keep up with all the changes. People were doing things the animals were not ready for, such as placing too much paper, hay, etc. to cover food, and the animals ended up not eating. *B.E. representatives increased verbal and written communication, providing easy to follow instructions placed by the cage doors. For safety and continuity, they themselves took over doing the*

majority of the enrichment training.

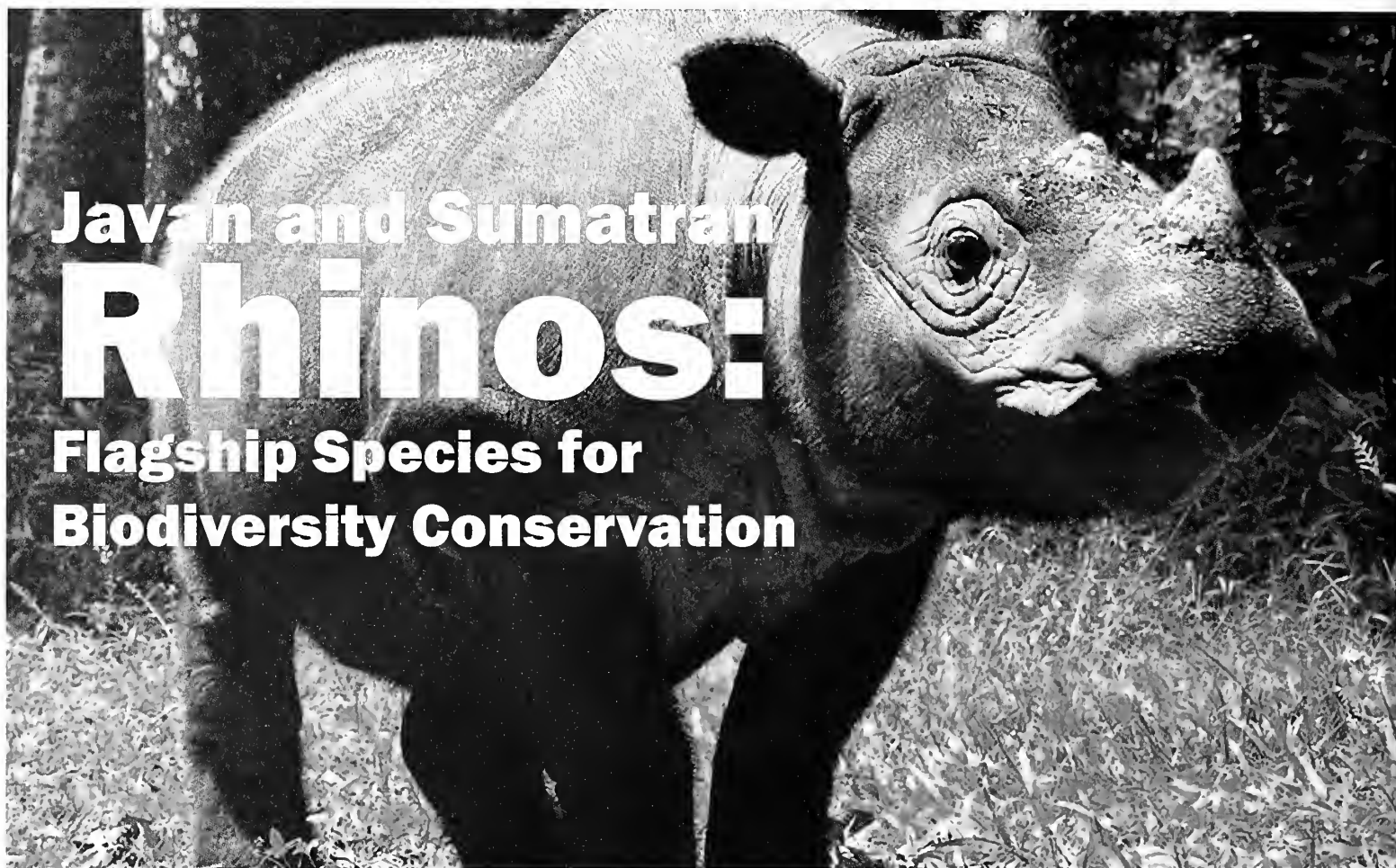
Ingestion of non-food related enrichment.

Paper products that became moist from the food stuck to diets and were sometimes ingested. *This idea was modified to use paper to cover dry food (pellets, grains, etc.) and whole fruit only, and paper was exchanged with leaves and sticks as mentioned above.*

Dealing with animals that are too smart

"Likits" (flavored boredom breakers) are good at holding equine attention, but the majority of the herd figured out how to bite them and snap them in half, thus defeating the purpose, since they all fell to pieces on the ground where they were accessible. Warthogs learned to retrieve pellets from the Moultrie® Easy Demand feeders much faster than was intended. *Staff started ordering "Likit hanging balls" that prevented horses from being able to bite the treat in half. Warthog demand feeders had to be reinforced/modified to create more difficulty in getting grain, as well as making the feeders sturdier against the powerful animals.*

**You can find Part 2 of this article
in the August Issue of AKF.**



Javan and Sumatran Rhinos:

Flagship Species for Biodiversity Conservation

Bill Konstant, Program Officer, International Rhino Foundation

Photo by Yayasan Badak Indonesia (YABI)


Javan and Sumatran rhinos

are arguably the two large terrestrial mammals most at risk of extinction today. Anti-poaching efforts that help ensure their survival also benefit dozens of other threatened species as well, thus we can refer to these critically endangered animals as “flagship species” for Indonesian biodiversity conservation.

Few strongholds remain for these rare and poorly known pachyderms. With the last of Vietnam’s Javan rhinos having been killed by poachers a few years ago, less than fifty individuals are believed to survive in Ujung Kulon National Park on the western tip of Java. The Sumatran rhino is more numerous, with perhaps 150 to 200 individuals left. However, only three viable populations exist in three Sumatran national parks – Bukit Barisan Selatan, Gunung Leuser and Way Kambas. A small, fragmented population barely hangs on in Sabah, Malaysia in extreme northeastern Borneo, but biologists have determined that it is essentially no longer viable in the wild.

Currently, Rhino Protection Units (RPUs) at work in Ujung Kulon, Bukit Barisan Selatan and Way Kambas receive support from the American Association of Zoo Keepers thanks to the success of annual Bowling for Rhinos events and other special fundraising efforts. The RPU program is managed jointly by

the International Rhino Foundation (IRF) and its Indonesian NGO partner, Yayasan Badak Indonesia (YABI). A total of 16 four-man patrol units are employed full-time to cover the three national parks, as well as a separate intelligence-gathering team that services the entire program. Collectively, the RPUs are responsible for the survival of close to 50% of the world’s remaining Sumatran rhinos and 100% of the remaining Javan rhinos. In addition, Indonesia’s RPU program helps protect nearly 60 other terrestrial vertebrates on the IUCN Red List of Threatened Species, including three amphibians, two reptiles, 17 birds and 35 other mammals. Bukit Barisan Selatan National Park harbors 38 threatened terrestrial vertebrates in addition to the Sumatran rhino, Way Kambas 36, and Ujung Kulon National Park 24, in addition to the Javan rhino.

The king cobra, Asian small-clawed otter, smooth-coated otter, binturong, and Malayan pangolin are threatened species found in all three national parks patrolled by RPUs. Zoo keepers that help support Sumatran and Javan Rhino protection efforts can take satisfaction that these programs also benefit such prominent endangered species as the white-winged wood duck, Javan banteng, Javan gibbon, siamang, Malayan tapir, Javan leopard, Sumatran tiger and Sumatran elephant – some of which must be considered “flagship species” in their own right. 

Common Name	Scientific Name	IUCN	BBSNP (S)	WKNP (S)	UKNP (J)
AMPHIBIANS					
Javan torrent frog	<i>Huia masonii</i>	VU			●
	<i>Kalophrynus minusculus</i>	VU			●
Fanged river frog	<i>Limnonectes macrodon</i>	VU		●	●
REPTILES					
King cobra	<i>Ophiophagus hannah</i>	VU	●	●	●
Burmese python	<i>Python bivittatus</i>	VU			●
BIRDS					
Blue-banded kingfisher	<i>Alcedo euryzona</i>	VU	●	●	
Sunda nightjar	<i>Caprimulgus concretus</i>	VU	●	●	
Javan coucal	<i>Centropus nigrorufus</i>	VU			●
Short-toed coucal	<i>Centropus rectunguis</i>	VU	●	●	
Sunda blue flycatcher	<i>Cyornis caerulatus</i>	VU	●	●	
Lesser adjutant	<i>Leptoptilos javanicus</i>	VU		●	●
Crestless fireback	<i>Lophura erythrophthalma</i>	VU	●	●	
Salvadori's pheasant	<i>Lophura inornata</i>	VU	●		
Black partridge	<i>Melanoperdix niger</i>	VU	●	●	
Great slaty woodpecker	<i>Mulleripicus pulverulentus</i>	VU			●
Wallace's hawk-eagle	<i>Nisaetus nanus</i>	VU	●	●	
White-winged wood duck	<i>Cairina scutulata</i>	EN	●	●	
Sumatran ground cuckoo	<i>Carpococcyx viridis</i>	EN	●		
Storm's stork	<i>Ciconia stormi</i>	EN	●	●	
Green peafowl	<i>Pavo muticus</i>	EN			●
Nordmann's greenshank	<i>Tringa guttifer</i>	EN		●	
Black-winged starling	<i>Sturnus melanopterus</i>	CR			

Collectively, the RPU's are responsible for the survival of close to 50% of the world's remaining Sumatran rhinos and 100% of the remaining Javan rhinos.

Common Name	Scientific Name	IUCN	BBSNP (S)	WKNP (S)	UKNP (J)
MAMMALS					
Asian small-clawed otter	<i>Aonyx cinerea</i>	VU	●	●	●
Binturong	<i>Arctictis binturong</i>	VU	●	●	●
Sumatran serow	<i>Capricornis sumatraensis</i>	VU	●		
Brook's dyak fruit bat	<i>Dyacopterus brooksi</i>	VU	●	●	
Malayan sun bear	<i>Helarctos malayanus</i>	VU	●	●	
Banded civet	<i>Hemigalus derbyanus</i>	VU	●	●	
Smooth-coated otter	<i>Lutrogale perspicillata</i>	VU	●	●	●
Pig-tailed macaque	<i>Macaca nemestrina</i>	VU	●	●	
Rajah spiny rat	<i>Maxomys rajah</i>	VU	●	●	
Whitehead's spiny rat	<i>Maxomys whiteheadi</i>	VU	●	●	
Sunda clouded leopard	<i>Neofelis diardi</i>	VU	●		
Sumatran striped rabbit	<i>Nesolagus netscheri</i>	VU	●		
Dark-tailed tree rat	<i>Niviventer cremoriventer</i>	VU		●	●
Javan slit-faced bat	<i>Nycteris javanica</i>	VU			●
Greater slow loris	<i>Nycticebus coucang</i>	VU	●	●	
Whiskered flying squirrel	<i>Petinomys genibarbis</i>	VU	●	●	
Temminck's flying squirrel	<i>Petinomys setosus</i>	VU	●	●	
Javan deer	<i>Rusa timorensis</i>	VU			●
Sambar	<i>Rusa unicolor</i>	VU	●	●	
Horsfield's tarsier	<i>Tarsius bancanus</i>	VU	●	●	
Javan leaf monkey	<i>Trachypithecus auratus</i>	VU			●
Javan banteng	<i>Bos javanicus</i>	EN			●
Dhole	<i>Cuon alpinus</i>	EN	●		●
Sunda otter civet	<i>Cynogale bennettii</i>	EN	●	●	
Agile gibbon	<i>Hylobates agilis</i>	EN	●	●	
Javan gibbon	<i>Hylobates moloch</i>	EN			●
Malayan pangolin	<i>Manis javanica</i>	EN			●
Javan loris	<i>Nycticebus javanicus</i>	EN			●
Javan surili	<i>Presbytis comata</i>	EN			●
Smoky flying squirrel	<i>Pteromyscus pulverulentus</i>	EN	●	●	
Siamang	<i>Symphalangus syndactylus</i>	EN	●	●	
Malayan tapir	<i>Tapirus indicus</i>	EN	●	●	
Sumatran elephant	<i>Elephas maximus sumatrensis</i>	CR	●	●	
Javan leopard	<i>Panthera pardus melas</i>	CR			●
Sumatran tiger	<i>Panthera tigris sumatrae</i>	CR	●	●	
			38	36	24

Key to Table

BBSNP: Bukit Barisan Selatan National Park

WKNP: Way Kambas National Park

UKNP: Ujung Kulon National Park

(S): Sumatra; **(J):** Java

VU: Vulnerable; **EN:** Endangered;

CR: Critically Endangered





2012 Orangutan SSP Field Trip

Matang Wildlife Rehabilitation Center and Tanjung Putang National Park

By Ida Lewis, AAZK Professional Travel Grant Recipient

In the fall of 2012, the Orangutan Species Survival Plan® (SSP) took a group of volunteers to Matang Wildlife Rehabilitation Center and Kuboh National Park, outside of Kuching, Sarawak in Malaysia. We worked with the Sarawak Forestry Department and the volunteer organization, Project Orangutan. We were there from October 14 through October 20, 2012. The center rehabilitates confiscated or orphaned orangutans and if possible,



Figure 1. Caregiver and young rescued orangutan

releases them into the surrounding park. While there we did see two baby orangutans that they were rehabilitating to prepare them for release back to the forest (Figure 1). Just before we left, one of the caregivers said they were going to spend several days in the forest with them to help get them used to being in the trees and watch to make sure they start to build night nests on their own. The center also houses other animals such as sun bears, gibbons, birds, reptiles and hoofstock. The park is open to the public. There were 14 people who participated in this trip. Ronda Schwetz, Field Adviser, Megan Elder, Vice Chair of the SSP and International Studbook Keeper, and Carol Sodaro, Husbandry Advisor, were the representatives of the Orangutan SSP. Other participants were Vince Sodaro, Christine Nelson, DVM, Cindy Cossaboon,

Crystal Champeau, Joe Myszkowski, Laura Mayo, Louis Divincenti, DVM, Matthew Mayer, Guillaume Feldman, Graham L. Banes and myself.

Before the trip, we were given instructions on what we may need by Ronda and REACT, the organization founded by Guillaume Feldman, that helped set up the trip along with the Orangutan SSP. They explained what vaccinations we would need, malaria prevention, type of clothing, paperwork, identification, along with a lot of mosquito repellant! We were also given information about local customs, including the proper way to interact with the local people and a little background on the area. They also explained what to expect when traveling and staying in Borneo. For me, this was a very unique opportunity to learn firsthand about another culture. The trip was very well-planned, even for the first-time traveler. The cost of these trips is rather high, but the chance to see what is happening in Borneo and the conservation and rehabilitation work being done is invaluable. I did not go as a representative of my zoo and I was self-funding my trip so expenses added up quickly! The \$1,000 Professional Travel Grant I received from the American Association of Zoo Keepers (AAZK) was a tremendous help. I would highly recommend these trips to any keeper or individual who wants to learn and experience firsthand what is happening in Borneo.

I and others took donated medical supplies (Figure 2) to the rehabilitation center and the local Fort Worth AAZK Chapter donated \$200.00 to assist the center's work. Ronda also shipped a gas powered drill to the center! One of our goals was



Figure 2 Donated medical supplies

to build a climbing structure for sun bear enrichment. The other goal was to show some of the staff how to carry out positive reinforcement training.

Flying to Malaysia is an experience in itself! The flight is about 25 hours. This trip took me from Dallas to Chicago to Hong Kong to Kuala Lumpur to Kuching. We were met at the airport in Kuching by Leo Biddle. He runs the volunteer program at the center along with Natasha Beckerson (Figure 3). We arrived at Matang and got settled into our long houses (Figure 4). We had bunk beds, western toilets, a shower, and running water, but no hot water. The room had a floor fan and a small refrigerator. Food and bottled water were provided by the center.

We had a wonderful local cook who made our meals. Being a vegetarian I did not mind all the rice and vegetables!

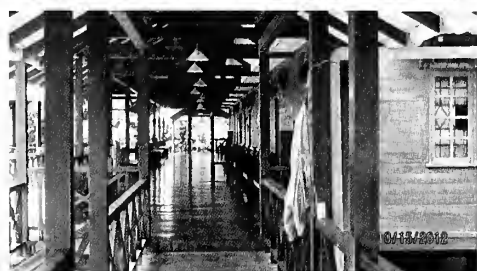
Personally, I am a big coffee drinker so I traveled with several packets of Starbucks Via®. I enjoyed the food and was always willing to try something new. They did have meat dishes and seafood. It was the start of the rainy season so it rained almost every day. Temperatures were in the upper 80's and very humid. Staying hydrated was very important. Everything stays damp. Even after a shower you never felt dry. The scenery around our long house was beautiful and we saw many types of wildlife (Figure 5). Day one was a workshop with the center's staff members. It started with the Orangutan SSP representatives giving overviews about what their roles are in the SSP. Ronda spoke about what a field representative does, Megan described how the studbook works and Carol talked about orangutan husbandry (Figure 6). Next we taught them about positive reinforcement training. Megan gave an overview of how it works, then Melanie Bond and I demonstrated the training game. The staff then split into smaller groups and worked on clicker training as our group observed and offered suggestions (Figure 7). After the first day our group split into two

smaller groups. Some went to work with the center's staff on animal training while others worked on the sun bear climbing structure. I worked on building the sun bear climber. The center's volunteer staff had the main steel poles already cemented in place. Joe and Vince were the main carpenters. Christine, Matthew and I worked on sanding and staining the wood planks (Figure 8). We had about a week to complete the structure and Joe was the driving force that made us all want to see it completed. The going could get tough sometimes, especially when it really started to rain. The construction had to stop until the rain let up. There really was not very much covered space at the center, so the sanding and staining took a while to do. Everything was hand-sanded. Our arms got a great workout! Toward the end of the week Crystal joined us and was a great help to the builders. She was fearless in climbing up and helping build. While we worked on the climbers the rest of the group continued to work with the staff on positive reinforcement training. While we were there one of the previously released orangutan females and her infant traveled through and was spotted around

the center a few times.

It was not all work. I think one of the best aspects of these trips is the opportunity to meet the people who work there on the ground and the local people. The first night we had a gathering with the center's staff, their families and some of the other volunteers. One day we visited another park called Semenggoh Nature Reserve. This is also run by the Sarawak Forestry Department. It was exciting to see orangutans up in the trees (Figure 9).

Toward the end of our week in Matang, our group split again with some of the members taking medical supplies to another rehabilitation center in Ketapang. Along with the supplies, Dr. Christine Nelson, DVM, went and she will spend a year in Ketapang. The rest of us were determined to finish building the climber so we could see the sun bears out on it before we left. Some of the rest of the group joined us to help finish the climber. Through hard work we were able to complete the climber and on our last day there we were able to watch the sun bears on their new climber (Figure 10).



(top) Figure 3. Leo Biddle from Project Orangutan
(middle) Figure 4. Long house in Matang
(bottom) Figure 5. Aslan horned frog at Matang



Figure 6. Carol Sadoro giving her presentation
Figure 7. Forestry personnel learning the training game
Figure 8. Sanding planks for the sun bear climber

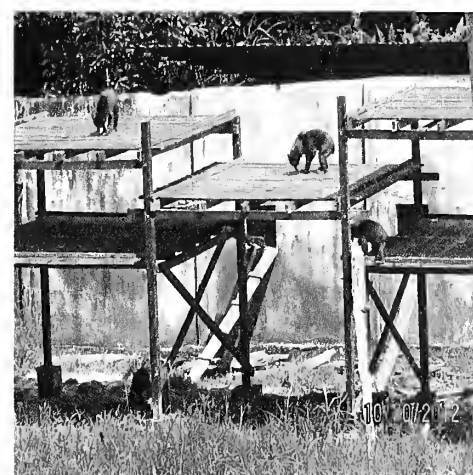


Figure 9. Orangutan feeding at Somongal National Park.
Figure 10. Sun bears on the climbing structure

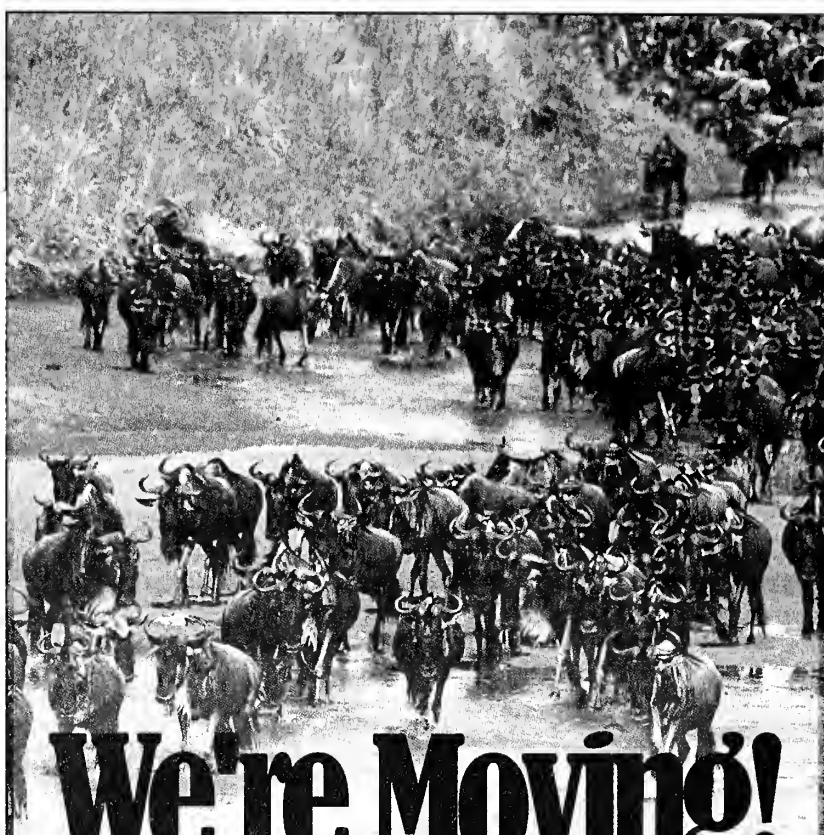
MEMBERSHIP Has its benefits!



Membership with the American Association of Zoo Keepers includes a subscription to *Animal Keepers' Forum* and free or discounted admission to many zoos and aquariums in the U.S. and Canada.

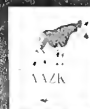
To download an application or to apply online, please visit AAZK.ORG.

AAZK is a nonprofit volunteer organization (U.S. 501(c)3) made up of professional zoo keepers and other interested persons dedicated to professional animal care and conservation.



We're Moving!

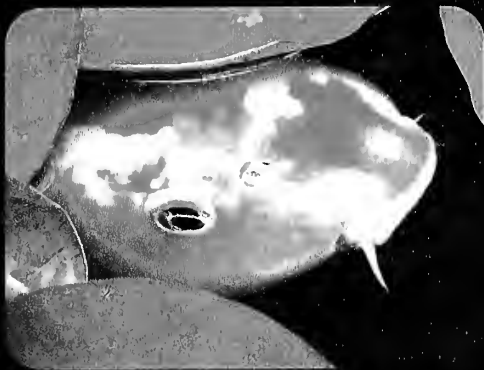
The AAZK Administrative Office has moved to Tucson, AZ. You can find our CEO's contact information on P. 305. Barbara Manspeaker can still be reached at the AAZK Topeka Office at: aazkoffice@zk.kscoxmail.com



SDAAZK 4th Annual Photo Contest



Photo by 2012 Best in Show winner, Sergio Izquierdo



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